1. You have a joint PMF of \( X \) and \( Y \) given by the following points \((x, y)\) with a probability of \( \frac{1}{6} \): \((1, 1), (1, 2), (3, 4)\), a probability of \( \frac{1}{2} \): \((-1, -2)\)

a) Find \( E[X] \).

b) Find \( E[Y] \).

c) Find \( \text{var}(X) \).

d) Find \( \text{var}(Y) \).

e) Find \( \text{cov}(X,Y) \).

f) Find \( \rho = \text{corr}(X,Y) \).

g) Find the PMF for \( Z = E[Y|X] \).

h) Find \( E[E[Y|X]] \).

i) Find \( \text{var}(X + Y) \).